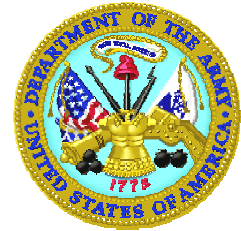




U.S. ARMY CENTER FOR
HEALTH PROMOTION
& PREVENTIVE MEDICINE
(USACHPPM)



DEPLOYMENT POTABLE WATER
SAMPLING KIT



*DEPLOYMENT ENVIRONMENTAL
SURVEILLANCE PROGRAM*

FEBRUARY 2003

Deployment Potable Water Kit Sampling Instructions

1. **Purpose.** To provide guidance to Medical Detachment (MED DET) or Preventive Medicine Service (PVNTMED Svc) personnel on the collection of potable water sampling using the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) deployment potable water sampling kit.

2. **Sampling Equipment** The deployment potable water sampling kit contains pre-preserved containers, blanks, preservatives, and administrative items. **Table 1** and **Figure 1** outlines the contents of one deployment potable water sampling kit. All containers and items are new, and should be used only once. The kit will either be contained in a cooler or bag.

Table 1. Inventory of Equipment in Deployment Potable Water Sampling Kit

ITEM #	ITEM DESCRIPTION	QUANTITY
1	Water Sampling Instructions	1
2	40 ml glass containers (MBAS, Tritium, Chloride, Fluoride, Sulfate, TOC, Nitrate/Nitrite, SVOC, VOC, Cyanide, Ammonia, total phosphate, Diquat/Paraquat, Glyphosate/Carbamates, Herbicides, Insecticides, EDB/DBCP and Endothall	16
3	125 ml glass containers (Metals, Gross Alpha/Beta, Alkalinity, pH, Color, Conductivity, TDS)	3
4	Blanks - 40 ml glass containers (SVOC, VOC, Diquat\Paraquat, EDB\DBCP)	4
5	Sample vial configuration chart	1
6	Water Sampling Bag (Blue)	1
7	Foam Insert with cover	1
8	Nitrile Gloves and towelettes	2 each
9	Pipettes	2
10	Dropper bottle or ampule of hydrochloric acid (HCl)	1
11	pH Paper	1 package
12	Permanent Marker	1
13	Sample pitcher (100 ml)	1
14	Water Sampling Field Data Sheet	1
15	Chlorine Paper (Not pictured) [May not be in all kits]	1 package
16	Supplementary Radiation Sampling Bottle (See Figure 12) [May not be in all kits]	1
17	Preservative for supplementary radiation sampling bottle (See Figure 12) [May not be in all kits]	1

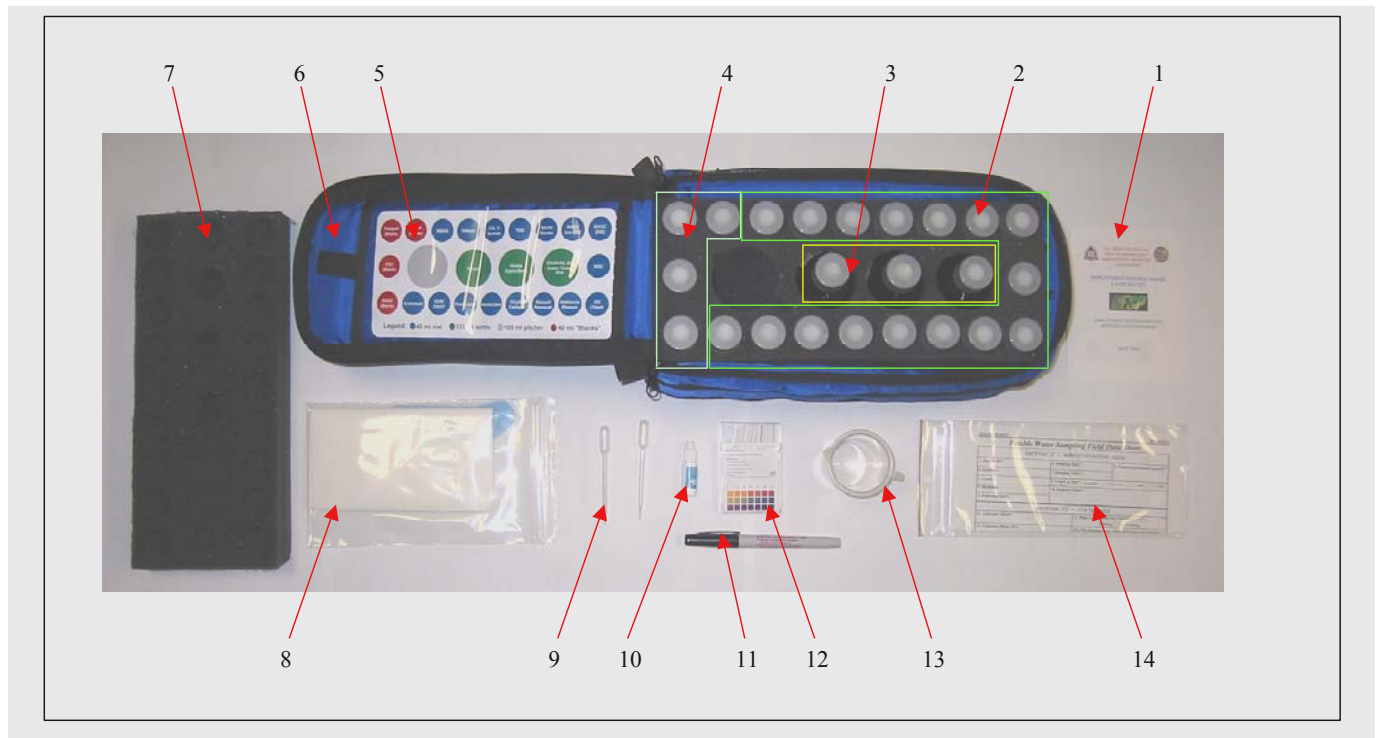


Figure 1

3. Water Source

- a. Source Water – Raw water prior to any treatment (e.g. well water, surface water, etc)
- b. Treated Water – Water after it passes through a typical type of treatment such as a Reverse Osmosis Water Purification Unit (ROWPU) prior to distribution.
- c. Distribution System - Water collected at representative points in the distribution system. Sampling at the dead end of a distribution line should be avoided.

2. Field Data Sheet. The sample collector is responsible for filling out the “Potable Water Sampling Field Data Sheet” included in each sampling kit. The data sheet should be completed and the original returned with the sample in a supplied re-closable 4” x 9” plastic bag. For future reference the sample collector should maintain a copy of the field data sheet.

3. General Sample Collection.

a. The potable water sampling kit is capable of testing for all regulated environmental contaminants (organic, inorganic, and radiological). The kit is not designed to analyze for bacterial analysis, bacterial analysis should be conducted on site. Samples can be collected from potable water sources, sources of potential potable water or sources of water used for personal hygiene or cooking.

b. Generally there are two types of water sample point configurations, closed source and open source.

1.) A closed water source (e.g. municipal system, ROWPU outlet) is usually access through a utility spigot or faucet. To collect a sample from this configuration turn the spigot or faucet on, and allow the water to run at a moderate flow for 3 to 5 minutes. This will clear out water that may have been standing in the plumbing system, and should begin a draw of water directly from the source or pipe main. A way to assure the withdrawal of water from the source or pipe main is to monitor the temperature. Once the temperature has stabilized, samples can be taken. If the water flow is too great to fill the containers without spillage or overflow use the included sampling pitcher to collect the water from the source and transfer into the sampling kit containers.

2.) Open water source (e.g. lakes, ponds, rivers) do not have a utility spigot or faucet access. To collect the sample from this configuration use the included sampling pitcher to collect the water from the source and transfer into the sampling kit containers.

4. Sample Collection Procedure.

a. Identify sampling point.

b. Remove foam insert, nitrile gloves, towelettes, pitcher, permanent marker, "Potable Water Field Data Sheet", preservative and pipettes from shipping container.

c. Record the following on the included "Potable Water Field Data Sheet" in accordance with the instructions on the back of the data sheet. Figure 2 shows an example "Potable Water Field Data Sheet".

1.) "Administrative" Section

- 1.
- Sample ID**
- Sample ID number CCC_LLL_NNW_YYDDD

Where: CCC – Country 3 letter abbreviation code

LLL - Camp abbreviation (i.e. first three letters of camp name)

NNW - Water sample number (NN) for that location on that particular day (e.g. 01W, 02W, etc)

YYDDD - jday code, last two year digits & three digit julian [e.g 03015 for 15-Jan-2003].

- 2.
- Location**
- Camp or location of sample

- 3.
- Country**
- Country in which location or camp is located.

- 4.
- Operation**
- Name of operation ongoing in the area of the sample [e.g. Operation Allied Force (OAF), etc] if applicable

- 5.
- Collecting Unit**
- Unit collecting the sample (e.g. TAML, 71
- st
- MEDDET, etc).

- 6.
- Sampling Date**
- Date sample was collected (e.g. 15-Jan-2003)

- 7.
- Sampling Time**
- Time sample was taken (e.g. 16:00)

- 8.
- Length of Stay**
- How long are troops expected to stay at the location where the sampling was conducted?

- 9.
- Percent of Personnel Exposed**
- What percentage of troop at the site could be exposed to the water source?

- 10.
- Exposure Notes**
- Any notes or comments associated with troop exposure to the sample source.

2.) "Field Data" Section

- 11.
- Collectors Name**
- The name of the person collecting the sample.

- 12.
- Collectors Phone No**
- The phone number of the person collecting the sample.

- 13.
- Water Source:**

Source Water - Raw water before treatment

Treated Water - Collected after the water passes through a typical type of treatment such as a ROWPU

Distribution System - Collected at representative points in the distribution system

- 14.
- Water Type:**

RWW - Raw Well Water **RS** - Raw Surface **ROWPU** – Reverse Osmosis Water Purification Unit**T** – Tap**WC** - Water Coolers**WT** – Water Tanker**WB** – Water Blivet**DS** - Distribution System**FD** - First Draw

- 15.
- Water Use**
- Is water used for drinking or non-drinking? (Select one, if non-drinking see 15a)

15a. Non-Drinking Uses – What are other uses of water? (e.g. Personal hygiene, Cooking, other)

- 16.
- Is this the primary drinking water?**
- Is the source tested the primary drinking water? Yes / No (Circle One)

- 17.
- Estimated Consumption Rate (liters per day)**
- Less than 5, Between 5 and 15, greater than 15? (Circle One)

- 18.
- Initial pH**
- The initial pH of the water before the sample is taken or before preservatives are added, if known

- 19.
- Water Temperature**
- The initial ambient temperature of the water being sampled, if known

- 20.
- Conductivity**
- The initial conductivity of the water being sampled, if known

- 21.
- Turbidity**
- The initial turbidity of the water being sampled, if known

- 22.
- Free available chlorine**
- The initial free-available chlorine (FAC) of the water being sample, if known

- 23.
- Total dissolved solids**
- The initial total-dissolved-solids (TDS) of the water being sampled, if known

- 24.
- Latitude**
- Sample latitude location in decimal degrees [from GPS]

- 25.
- Longitude**
- Sample longitude location in decimal degrees [from GPS]

- 26.
- MGRS**
- Location in Military Grid Reference System (MGRS) from GPS, ten digit grid with grid square identifier (e.g. 34TEN1234567890)

- 27.
- Datum**
- : Datum from map or GPS used (e.g. WGS84, etc)

- 28.
- Field Notes**
- Notes relating to sampling episode (e.g. unusual circumstance, weather, potential pollution sources, etc)

- 29.
- Sampling Site Graphic**
- Any graphical or pictorial description of the sampling site. May include a digital picture of the sampling site once sample is processed.

Potable Water Sampling Field Data Sheet

Section I - Administrative Data			
1. Sample ID*:	6. Sampling Date*:	9. Percent of personnel exposed?*	
2. Location:	7. Sampling Time*:		
3. Country:	8. Length of Stay*: < 2 weeks / < 6 months / < 1 year / > 1 year (Select One)		
4. Operation:	10. Exposure Notes*		
5. Collecting Unit*:			
Section II - Field Data			
11. Collectors Name*:		15. Water Use*: (Select One, if non-drinking see 15a) Drinking / Non-Drinking	
12. Collectors Phone No*:		15a. Non-Drinking uses (Select all that apply, and/or add others.) Personal Hygiene, Cooking, _____, _____	
13. Water Source*: (Select One) Source / Treated / Distribution System		16. Is this the primary drinking water?* (Select One) Yes / No	
14. Water Type*: (Select One) RWW / RS / ROWPU / T / WC / WT / WB / DS / FD		17. Estimated Consumption Rate (liters per day)* (Select One) less than 5 / between 5 & 15 / greater than 15	
18. Initial pH:		21. Turbidity: <i>NTU</i>	
19. Water Temperature: <i>oC</i>		22. Free Available Chlorine <i>mg/L</i>	
20. Conductivity: <i>mV</i>		23. Total Dissolved Solids <i>mg/L</i>	
GEOLOCATION	Decimal Degrees	OR	26. MGRS*:
24. Latitude*:			
25. Longitude*:			27. Datum*:
28. Field Notes*:			
29. Sampling Site Graphic			

d. Put on provided nitrile gloves and remove wipes from its plastic bag.

e. Using the included pH and chlorine test strips [Figure 3] test and record the *pH* and *Free Available Chlorine* on the on the “Potable Water Field Data Sheet”. If other testing instrumentation is available record *Temperature*, *Conductivity* or *Total Dissolved Solids (TDS)* and *Turbidity*.



Figure 3

f. Fill and label all the provided empty containers one at a time from the water source by the following procedure. **NOTE: The VOC, Endothall, and Glyphosates containers have special collection procedures.**

1.) Remove container from foam insert. [Figure 4]

2.) Carefully unscrew the container cap ensuring the cap is place in a matter to avoid contamination. [Figure 5]



Figure 4

3.) Fill container slowly to avoid splashing using either the supplied pitcher [Figure 6] or directly from the water source [Figure 7].

4.) Completely fill the container ensuring it is not over filled, over filling the container will expel required preservative from the container, and can invalidate the sample



Figure 5



Figure 6



Figure 7

5.) For filling the VOC, Endothall, and Glyphosates containers follow these additional steps

a.) VOC, Endothall and Glyphosate containers must be collected carefully to avoid the presence of air bubbles in the containers. Pour sufficient sample into the containers to form a reverse meniscus (rounded surface) at the top of the container.

[Figure 8]



Figure 8

b.) For the VOC container **ONLY**, after the container is partially filled, add 5 drops of hydrochloric acid (HCl) either from the provided dropper bottle or from ampule using the provided pipette, then finish filling the container and obtain a reverse meniscus.

[Figure 9]



Figure 9

6.) Carefully replace the container cap hand tight. NOTE: It is normal for some minimal sample liquid to be expelled from the container when the cap is tightened.

7.) Invert the sample container a several times to effect preservative mixing [Figure 10]



Figure 10

a.) For the VOC, Endothall and Glyphosate containers ensure that no air bubbles remain in the sample. To check this, turn the capped container upside down and tap the side lightly (with the palm of your hand) to force any bubbles to rise. If bubbles are present, remove the cap (**do not empty the container**) and add enough water to remove the headspace at the top of the container. [An example of a container with air headspace is shown in Figure 11.]



Figure 11

- 8.) Complete the container label using the supplied permanent marker and the following guidelines. [Figure 12]

Note: Let marker ink dry 1-2 minutes before reinserting labeled container in foam insert.

- a.) All sample containers should be pre-labeled. Each label will have the Preservative and Analysis Required fields completed. The POC and Project Number field may also be completed; if these fields are not completed, they do NOT need to be by the sample collector.
- b.) The sampling personnel are responsible for recording the Installation, Sample #, Date Collected and Time Collected.

PROJECT:	47-24-2606-99
INSTALLATION:	Camp Eagle
POC:	Hutchens
SAMPLE #:	BOS_EAG_01W_02185
DATE COLLECTED:	04 JUL 2002
TIME COLLECTED:	1500
SAMPLE PRESERVED:	25 mg ascorbic acid / 5 drops 1:1 HCl
ANALYSIS REQUIRED:	VOC

Required Data: Installation Sample #, Date Collected, Time Collected

Pre-Labeled Data: Sample Preserved, Analysis Required

Optional Data either completed by laboratory or entered in the field: Project and POC

Figure 12. Example Water Sample Label

- 9.) Replace container in foam insert.

g. Repeat these steps for each of the sample collection containers.

h. In some kits there will be an additional plastic 16 oz bottle and HNO₃ nitric acid preservative vial [Figure 13]. Fill the bottle partially, add the entire vial of nitric acid then finish filling the bottle



Figure 13

5. Blanks. As part of the Quality Control/Quality Assurance (QA/QC) procedures for the analysis, EDB/DBCP, Diquat/Paraquat, SVOC and VOCs blanks (40-milliliter containers already filled with water from the USACHPPM laboratory) are included in the sampling kit. Keep the blanks with the sample containers at all times. **DO NOT OPEN THEM AT ANY TIME.**

6. Packaging of Samples.

- a. Ensure all sample collection containers are filled.
- b. Ensure that all containers are labeled completely and accurately.
- c. Ensure that the caps are placed securely on each of the sample containers.
- d. Place containers in the foam insert in which they arrived.
- e. Place the foam insert and cover into the blue water sampling bag.
- f. Place original "Potable Water Field Data Sheet" in a 4" x 9" re-closable plastic bag. Then place in the slip pocket on the inside top of the bag lid.
- g. Place insert in cooler.
- h. Place ice or ice packs in cooler, **(DO NOT use dry ice, or allow samples to freeze)**
- i. Seal and secure cooler with tape.
- j. Place return address (Collectors Address) in the top left hand corner of the sampling pack or cooler and address it to the following **[Figure 14]**:

Heidi Taylor USACHPPM ATTN: MCHB-DC-LLI, Bldg E-2100 5158 Blackhawk Road Aberdeen Proving Ground, MD 21010-5422 PHONE: (410) 436-3269
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Figure 14

7. Shipping of Samples. Samples should be transported from the field as soon as possible to ensure holding times are met. Transportation is usually accomplished by a major carrier such as Federal Express or United Parcel Service. However if these services are not available U.S. Postal or military shipping should be arranged. Send email to chppm-oehs-data@apg.amedd.army.mil including date shipped, shipping number, number and type of sample(s) and name of sample collector.

8. Point of Contacts. Questions and/or comments concerning the deployment potable water sampling kit should be referred to the USACHPPM, Deployment Environmental Surveillance, at DSN 312-584-6096 or commercial 410-436-6096 or by email at Brad.Hutchens@apg.amedd.army.mil.

ID	Sampling Group	Preservative for pH	Amount	Preservative Residual CL	Amount	Volume (ml)	Holding Time
1	MBAS					40	48 hours
2	Tritium					40	na
3	Chloride, Flouride, Sulfate					40	48 hours
4	TOC	pH<2 Sulfuric acid (H2SO4)	5 drops			40	28 days
5	Nitrite/Nitrate	pH<2 Sulfuric acid (H2SO4)	5 drops			40	28 days
6	SVOC (Un-Chlorinated)	pH<2 , 1:1 Hydrochloric acid (HCL)	3 drops			40	14 days
7	SVOC (Chlorinated)	pH<2 , 1:1 Hydrochloric acid (HCL)	3 drops	Sodium sulfite (Na2SO3)	25 mg	40	14 days
8	VOC (incl TTHM)	pH<2 , 1:1 Hydrochloric acid (HCL)	3 drops	Ascorbic acid (C6H8O6)	25 mg	40	14 days
9	Cyanide (Total)	pH>12 Sodium hydroxide (NaOH)	3 drops	Ascorbic acid (C6H8O6)	24 mg	40	14 days
10	Ammonia and Total Phosphate	pH<2 Sulfuric acid (H2SO4)	5 drops			40	14 days
11	Diquat/Paraquat	pH<2 Sulfuric acid (H2SO4)	3 drops	Sodium Thiosulfate (Na2S2O3)	3 mg	40	7 days
12	Glyphosate/Carbamates	pH<3, monochloroacetic acid	1.2 ml	Sodium Thiosulfate (Na2S2O3)	3 mg	40	14 days
13	Herbicides			Sodium Thiosulfate (Na2S2O3)	3 mg	40	14 days
14	Pesticides			Sodium Thiosulfate (Na2S2O3)	3 mg	40	7 days
15	EDB/DBCP			Sodium Thiosulfate (Na2S2O3)	3 mg	40	14 days
16	Endothall			Sodium Thiosulfate (Na2S2O3)	3 mg	40	7 days
17	Alkalinity, pH, color, conductivity, TDS					125	48 hours
18	Metals (incl Mercury), Turbidity, Hardness	pH<2, Nitric acid (HNO3)	15 drops			125	28 days
19	Gross alpha/beta	pH<2, Nitric acid (HNO3)	15 drops			125	na
20	Blank (SVOC)	pH<2 , 1:1 Hydrochloric acid (HCL)	3 drops	Sodium sulfite (Na2SO3)	25 mg	40	
21	Blank (VOC)	pH<2 , 1:1 Hydrochloric acid (HCL)	3 drops	Ascorbic acid (C6H8O6)	25 mg	40	
22	Blank (Diquat/Paraquat)	pH<2 Sulfuric acid (H2SO4)	3 drops	Sodium Thiosulfate (Na2S2O3)	3 mg	40	
23	Blank (EDB/DBCP)			Sodium Thiosulfate (Na2S2O3)	3 mg	40	

Figure 15. Deployment Potable Water Sampling Kit - Container Description and Preservative Requirements